A Chronology of the Los Alamos Neutron Science Center

Year	Significant Events in the Evolution of LANSCE
1968	Los Alamos Meson Physics Facility (LAMPF) official ground-breaking ceremony (February 15, 1968). The original concept is funded by the Department of Energy (DOE) Office of Defense Programs (DP)[1] at $10 million.[2] The total construction cost of the original facility to DOE Office of Science (SC) is $57 million. (The cost to replace the entire facility today is over $1 billion.)
1969	A study for the construction of a neutron facility (Targets 1 and 2)[3] at LAMPF begins. The study is funded at $3 million per year by DP for operations and at about $6 million for initial construction costs.
1971	Design and prototype studies are conducted, and the first workshop on design concepts for a PSR using H- injection is held. This work is funded by DP at about $2 million.
1972	An 800-MeV beam is achieved in LAMPF linear accelerator on June 9.
1973	Area A receives first meson production beam on August 26. Construction begins on Targets 1 (10 μA) and 2 (100 nA) for neutron facility. The work is funded by DP at $5.5 million.
1974	The Proton Storage Ring (PSR) design begins. The work is funded by DP.
1976	PSR operating modes are decided: • 20-μA average current, • short bunch (1 ns, 720 pps (pulses per second), 10^{11} protons/pulse), and • long bunch (270 ns, up to 12 pps, 5×10^{13} protons/pulse).
1977	Target 1 (graphite target) receives proton beam on May 13. The first tantalum neutron production target with polyethylene moderators is installed. PSR construction budget request for $16.3 million (20 μA maximum) is submitted to DP.
1978	After discussions with DOE Office of Basic Energy Science (OBES) on an upgrade for materials science, the PSR designers are directed to commit 100-μA average current by Physics Division Leader Dick Taschek. A revised budget request is submitted to DP for $21.1 million.

1979	Congress authorizes $19 million and appropriates $16.7 million for the PSR construction. The first tungsten neutron production target (Target 1) with water moderators is installed**.**
1980	In December, DOE authorizes construction of the PSR at a cost of $21.8 million. ***Report of the Review Panel on Neutron Sources***, chaired by W. Brinkman in October, recommends the construction of an experimental hall at Lujan Center (now ER-2). During the 1980s, the High Intensity Powder Diffractometer (HIPD), the Filter Difference Spectrometer (FDS), and the Single Crystal Diffractometer (SCD) are constructed.
1983	The LAMPF accelerator produces a 1.2-mA proton beam on February 7. It remains, in 2000, the most powerful proton accelerator in the world, a position shared with the Paul Scherrer Institute. A decision is made to defer indefinitely the construction of the short-bunch capability for the PSR.
1984–1986	Target 4 is constructed because fast-neutron capability ended at Target 1. DP provides $4 million for the effort. Three years of institutional funding supports the construction of a new small-angle diffractometer (LQD) at the Lujan Center.
1985	The first flux-trap moderator system is installed in Lujan Center. A composite reflector shield that extends the bulk-shield capability at Lujan Center from 10 μA to 100 μA is installed. The PSR receives the first proton beam in April; 25 μA is achieved in December.
1986	The neutron-scattering facility becomes a National User Facility Target 4 receives the first beam (500 nA). The Line D by-pass is completed with DP funds allowing for simultaneous operation of Target 1 at the Lujan Center and Targets 2 and 4 at the Weapons Neutron Research (WNR) facility. DOE Office of Basic Energy Sciences (OBES) obtains $18 million for construction for ER-2 and for office and laboratory space at the neutron scattering center. The LQD receives first beam, and a user program begins.
1987	The ground-breaking ceremony for ER-2 is held in May.

1988	Construction of ER-2 is completed. The Neutron Powder Diffractometer (NPD), the highest resolution NPD in the United States, and SPEAR, a new neutron reflectometer, receive first beam, and user programs begin. Both instruments are constructed using funds from the ER-2 construction moneys. These are the first two instruments to be partially housed in the new experimental room ER-2. The first User Group Meeting for the Lujan Center as a National User Facility occurs May 2-3.
1989	New Lujan Center laboratory and office spaces are occupied. On July 6, the Lujan Center is dedicated in honor of Manuel Lujan, Jr., a member of Congress from the Northern District of New Mexico and subsequent Secretary of the Interior.
1990	A research program in the measurement of internal strain is initiated using NPD. This program grows to be the best such research program in the world.
1992	PHAROS, a high-resolution chopper spectrometer, is constructed with funds from the ER-2 construction moneys, and a user program begins. (Only the Brillouin scattering option could be completed with the available funds.)
1993	DOE Office of High Energy and Nuclear Physics (OHENP) indicates that it intends to cease supporting the LAMPF facility. A Los Alamos National Laboratory reorganization creates the LANSCE/ER program office with John C. Browne as program director. This action begins the change in emphasis for the accelerator complex to neutron science. Based on proposals prepared in collaboration with the universities noted below, the Lujan Center receives funding from the Congressional Scientific Facilities Initiative for • improvements to the polarized reflectometer capabilities [University of California, San Diego (UCSD)], • implementation of the PHAROS wide-angle detector bank (UCSD, University of Michigan, Michigan State University, John Hopkins University, and University of Pennsylvania), and • development of a 30-T repetitively pulsed magnet in collaboration with National High Field Magnet Laboratory (NHFML) (Florida State University).

1994	The LANSCE Reliability Improvement Project (LRIP) Phase I is funded by the Department of Defense (DoD). The proposal team originally asks for $70 million to convert LAMPF to LANSCE and improve beam reliability. Congress passes a $15 million allocation and notes that the full scope of the project is $50 million. Phase I consists of a number of shorter-term reliability improvements and repairs to beam-delivery systems.
1995	1995 marks the last year of OHNEP funding. $22.5 million is allocated. A conference on Defense, Basic, and Industrial Research at LANSCE confirms the role that neutrons from LANSCE play in the Stockpile Stewardship Program. The accelerator complex (Lujan Center, the linear accelerator, WNR, and other experimental areas) is renamed the Los Alamos Neutron Science Center (LANSCE) and DP assumes responsibility for LANSCE Facility. The LRIP Phase II upgrade is funded at $20 million by the DoD. Phase II consists of the direct H- injection upgrade for PSR and a new target-moderator-reflector system (TMRS) for Lujan Center with an overhead outside bridge crane and target access port.
1996	DOE funds the Short-Pulsed Spallation Source (SPSS) enhancement project; SC funds the development of more neutron scattering instrumentation for the Lujan Center ($25 million); and DP funds accelerator upgrades to double the beam current to 200 μA ($16.7 million). The first LANSCE User Group meeting is held August 19-20. A Proposal Evaluation Committee (PEC) is formed to recommend which instruments should be built as part of the SPSS project, funded by DOE/OBES.
1997	LANSCE solicits ***Letters of Intent*** to be evaluated by the Proposal Evaluation Committee for development of new neutron scattering spectrometers at the Lujan Center. Twenty-three letters are submitted. DOE Office of Biological and Environmental Research (OBER) funds the construction and operation of a protein crystallography station. The LANSCE/ER program office and the Accelerator Operations and Technology Division merge to form LANSCE Division. Experimental areas and accelerator operations are consolidated under one division director. LANSCE completes a very successful run period in which the Lujan Center receives beam for ten months over a thirteen-month period for a total of 302 mA-hours at an average current of 70 μA with 83% availability. Following recognition that the Lujan Target is a Category 3 Nuclear Facility, a Basis for Interim Operations (BIO) is prepared. The BIO includes the operation of the Area A irradiation facility, is completed in less than four months, and requires minimal operational resources.

1998	Feri Mezei joins LANSCE as the first John Wheatley Scholar. SSPS/PSR buncher and utility upgrades are completed. Installation of the LRIP Phase II upgrade is completed July 1998, and the PSR injection upgrade commissioning begins. Authorization to operate the target is obtained, Target 1 receives the first beam in October, and 100 μA to Target I is achieved on November 19. The PEC recommends that two inelastic instruments, HELIOS and HERMES, be constructed as part of the SPSS enhancement project. The PEC recommends that two neutron diffractometers, the Spectrometer for Materials Research at Temperature and Stress (SMARTS) and the High-Intensity Neutron Diffractometer (HIPPO), be constructed as part of the SPSS enhancement project. A four-month extension of the Lujan target BIO is granted in November to allow continued operation until a scheduled shutdown. This extension is essentially ***pro forma*** and requires no additional analysis.
1999	In February, a safety stand down of the entire LANSCE mesa is initiated by LANSCE management and eventually lauded by the Secretary of Energy. Individual activities at the facility resume following thorough safety assessments. The linear accelerator starts up in early May. WNR and the Proton Radiography Facility resume ***full*** operations at the end of May. The Lujan BIO expires in March. DOE/LAAO significantly changes the requirements for renewal. Renewal of the Lujan BIO ultimately takes fourteen months and costs $2 million. Four new shutters are installed at the Lujan Center for new instruments construction in 2000.
2000	Thomas Holden joins LANSCE as the John Wheatley Scholar. The Lujan Center resumes operation in mid-June with full user support on only three spectrometers (due to budget constraints) and with a special agreement with the University of California for a program on the HIPD to train faculty and students in preparation for the commissioning of the new HIPPO instrument. The other neutron-scattering spectrometers operate with only partial support for users. Installation begins on three instruments of the SPSS project: SMARTS, HIPPO, and the Protein Crystallography Diffractometer. Installation also begins on one nuclear science instrument (DANCE). The HELIOS spectrometer proposal, part of the SPSS enhancement project, is modified to construct an alternative inelastic scattering instrument, VERTEX, which has higher resolution. The HERMES backscattering spectrometer proposal, part of the SPSS enhancement project, is modified to construct an alternative inelastic scattering instrument, SABER, whose essential difference is the use of silicon rather than graphite as an analyzer. Both SABER and VERTEX undergo baseline reviews.

[1] The names used for agencies, laboratories, offices, and programs are the current ones and not necessarily those of the years indicated.

[2] Funding is given in the dollars of the year indicated unless otherwise specified. DP funding includes significant amounts of Laboratory discretionary funds.

[3] Target 1 is the Lujan Center spallation target. Target 2 is the Weapons Neutron Research (WNR) “Blue Room” where tests of the Spallation Neutron Source (SNS) mercury targets, Neutron Resonance Spectroscopy (NRS), and other experiments requiring proton pulses are done. Target 4 is the WNR unmoderated, high-energy neutron spallation source.